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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/727,018

12/02/2003

Bruce McArthur

38203-6080C

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05/20/2005

DAVID A. HALL
HELLER EHRMAN LLP
4350 LA JOLLA VILLAGE DRIVE #700
7TH FLOOR
SAN DIEGO, CA 92122

EXAMINER

STOCK JR, GORDON J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/727,018

Applicant(s)

MCARTHUR ET AL.

Examiner

Gordon J. Stock

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) 19-44 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 is/are allowed.
- 6) ☒ Claim(s) 1-14, 16, 18 and 45-53 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Terminal Disclaimer

1. The Terminal Disclaimer filed February 22, 2005 was not deemed proper.

The application/patent being disclaimed has been improperly identified since the number used to identify the patent being disclaimed is incorrect. The correct number is 6,573,986.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. **Claims 1, 2, 4, 6, 7** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **claims 1-3, and 9** of U.S. Patent No. 6,573,986

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(**Smith et al.**). Although the conflicting claims are not identical, they are not patentably distinct from each other because **claims 1, 2, 4, 6, and 7 and claims 1-3** are both method claims for determining intra-field distortion in a projection imaging tool; whereas, the method comprising exposing a reticle pattern in two positions thereby having an alignment attribute comprising an overlay of at least two arrays of alignment attributes with desired directions in both x and y directions; whereas, the alignment attributes are marks on a semiconductor wafer.

4. **Claim 3** is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **claim 9** of U.S. Patent No. 6,573,986 (**Smith et al.**). As for **claim 3** see above with **claim 2** and **claim 9** (**Smith et al.**). In addition, as for **claim 3**, **claim 9** of Smith is silent concerning measuring using a lithography tool wafer alignment mark measurement system. However, it is well-known in the art that exposure systems have alignment measuring systems for proper positioning of the wafer with the reticle. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the measuring of the positional offsets be performed by a lithography tool wafer alignment mark measurement system, for photolithographic exposure apparatus have the mask and wafer properly aligned and positioned through using a wafer alignment mark measurement system to measure mark positions.

5. **Claims 8-13** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **claim 1** of U.S. Patent No. 6,573,986 (**Smith et al.**) in view of applicant's disclosure of prior art. As for **claims 8-13** see above with **claim 7** and **claim 1** (**Smith et al.**). In addition, as for **claims 8-13**, **claim 1** of Smith is silent concerning the particular type of alignment attribute. However, applicant's disclosure of prior art teaches the

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following typical alignment attributes: box in box, frame in frame (Fig. 14), gratings, vernier pairs, Van der Pauw resistors, capacitor structures (page 14 lines 5-12). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the alignment attributes comprise any of the following: box in box, frame in frame, gratings, vernier pairs, Van der Pauw resistors, capacitor structures, for these are art recognized equivalents for measuring overlay on wafer substrates.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claims 16 and 18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. The term "higher order contributions" in **claims 16 and 18** is a relative term which renders the claim indefinite. The term "higher order" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. "Higher order" renders the magnitude of the order of contributions to the intrafield distortion indefinite.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

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international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. **Claims 1-14 and 45-53** are rejected under 35 U.S.C. 102(e) as being anticipated by

Smith (US 2004/0233402).

As for **claims 1-14**, Smith discloses the following: producing an exposure of a reticle pattern on a substrate with a recording media in a first position, wherein the reticle pattern includes at least one array of alignment attributes (paragraph 0110); producing an exposure of the reticle pattern on the substrate in a second position, wherein the exposure of the reticle pattern in the second position is shifted in a desired direction by a desired amount, wherein an alignment attribute exposed during the first exposure and an alignment attribute exposed during the second exposure form a completed alignment attribute (paragraphs 0111-0113); measuring positional offsets of the alignment attributes in the completed alignment attribute (paragraph 0114); determining a lens distortion map from the resulting positional offsets (paragraphs 0114-0115; Fig. 16); the alignment attributes are wafer alignment marks (Fig. 26); wherein measuring of the positional offsets is performed by a lithography tool wafer alignment mark measurement system (paragraphs 0075 and 0078); wherein the desired directions correspond to an X and Y direction (Fig. 27); wherein the at least one array of alignment attribute further comprises a first and a second array of alignment attributes wherein the first and second arrays of alignment attributes have features complementary to each other and the arrays have the same pitch and are offset from each other (Fig. 11); wherein the reticle pattern in the second position is shifted so that the second exposure of the array of alignment attributes overlay the first exposure of the array of alignment attributes thereby forming a completed alignment attribute (paragraph 0114); wherein the completed attribute comprises frame in frame alignment attribute, gratings, vernier

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pairs, Van der Pauw resistors and capacitor structures, electrical test structures (paragraph 0076); wherein the reticle pattern is a curved field from the curved projection field, projection lens (Fig. 18: projection lens).

As for **claims 45-53**, Smith discloses the following: providing an illumination source (Fig. 18: laser light source) with a curved projection field, projection lens (Fig. 18: projection lens); producing an exposure of a curved field reticle pattern from a curved projection field, projection lens (Fig. 18: projection lens) on a substrate with a recording media in a first position, wherein the reticle pattern includes at least one array of alignment attributes (paragraph 0110); producing an exposure of the curved field reticle pattern from a curved projection field (Fig. 18: projection lens) on the substrate in a second position, wherein the exposure of the reticle pattern in the second position is shifted in a desired direction by a desired amount, wherein an alignment attribute exposed during the first exposure and an alignment attribute exposed during the second exposure form a completed alignment attribute (paragraphs 0111-0113); measuring positional offsets of the alignment attributes in the completed alignment attribute (paragraph 0114); determining a lens distortion map from the resulting positional offsets (paragraphs 0114-0115; Fig. 16); the alignment attributes are wafer alignment marks (Fig. 26); wherein measuring of the positional offsets is performed by a lithography tool wafer alignment mark measurement system (paragraphs 0075 and 0078); wherein the completed attribute comprises box in box attributes, frame in frame alignment attribute, gratings, vernier pairs, Van der Pauw resistors and capacitor structures, electrical test structures (paragraph 0076); wherein the reticle pattern is a curved field from the curved projection field, projection lens (Fig. 18: projection lens).

The applied reference has a common assignee and one common inventor (Smith) with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Allowable Subject Matter

11. **Claim 17** is allowed.

Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 16 and 18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

As to **claim 15**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method of determining intra-field distortion in a projection imaging tool x-tilt and y-tilt Zernike coefficients of the projection imaging system are determined, in combination with the rest of the limitations of **claims 15-16**.

As to **claim 17**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method of determining intra-field distortion in a projection imaging tool x-tilt and y-tilt Zernike coefficients of the projection imaging system are determined, in combination with the rest of the limitations of **claims 17-18**.

Response to Arguments

12. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. As for the remarks regarding the double patenting rejection, please refer to Terminal Disclaimer section above.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

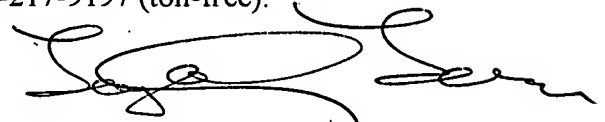
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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



gs

May 16, 2005



Layla Lauchman
Primary Examiner
Art Unit 2877